

Grass Seed Fertility

The current objectives of the Grass Seed Fertility Experiment are (1) to gain information on the requirement of phosphate, potash and sulfur fertilizers in the production of grass seed, (2) obtain information on the time of year the nitrogen application should be made, and (3) to determine whether that application should be a single or split application.

The experiment consisted of four locations, two in the Madras area and two in the Culver area. Two of the locations were Merion Bluegrass, one was C-1 Kentucky Bluegrass and one Kentucky Bluegrass.

The following is a list of the cooperators, the cropping history of the plot area and the probable soil type.

Henry David, Culver, Oregon  
Agency loam  
Merion Bluegrass

1961	Merion Bluegrass	350# clean seed
1960	Merion Bluegrass 150# N, 110# P <sub>2</sub> O <sub>5</sub> and 65# K <sub>2</sub> O	150# clean seed
1959	New seeding Merion Bluegrass (spring planted) 300# 16-20-0	
1958	Barley, 350# Ammon. Sulphate	2 ton yield
1957	Ladino clover, 200# Gypsum	

John D. Steinbeck, Culver, Oregon  
Agency loam  
Kentucky Bluegrass

1961	Kentucky Bluegrass 600# 20-15	410# seed per Acre
1960	Kentucky Bluegrass, volunteer grain, cheat grass	
1959	Fall seeding Kentucky Bluegrass	

Leslie Ramsey, Jr., Madras, Oregon  
Madras Sandy loam  
C-1 Kentucky Bluegrass

1961	C-1, 110# N as 20-15	
1960	C-1, 98# N as 20-15	
1959	C-1, New seeding - no fertilizer	
1958	Potatoes, 80# N., 60# P <sub>2</sub> O <sub>5</sub> and 60# K <sub>2</sub> O	
1957	Barley	
1956	Red Clover	

Marvin Light, Madras, Oregon  
 Madras loam  
Merion Bluegrass

1961 Merion Bluegrass	410# clean seed
600# 20-15-0	
1960 Merion Bluegrass	650# clean seed
650# 20-15-0	
1962 Merion Bluegrass	300# clean seed
(Remainder of field received the following:	
Fall - 108# N, 60# P <sub>2</sub> O <sub>5</sub> (as 16-20) applied 12/21/61	
Spring - 200# Urea applied 3/14/62 )	

The sources of fertilizer used in the experiment were:

N - Ammonium Nitrate 33.5%  
 P<sub>2</sub>O<sub>5</sub> - Treole Superphosphate 48%  
 K<sub>2</sub>O - Muriate of Potash 60%  
 S - Gypsum 18%

Soil samples were taken at each location but the results are not available at this writing.

The fertilizer treatment, yield of seed in pounds per acre, multiple range significance, pounds per acre light seed, and certain agronomic data for each location is presented in Tables Nos. 1, 2, 3, and 4. The light seed figure does not include the blank seed which was taken out by the wind at threshing and seed cleaning. There was a relatively high percentage of blank seed at each location.

The phosphate, potash and sulfur fertilizers reacted more to location than to variety of grass or other sources of variation. In no case was the response to these three elements significant, however, it was large enough to be considered. At the Ramsey location the response was to potash. This may be important in that the farmer has used large amounts of phosphate and sulfur in the cropping history but only a small amount of potash during one year.

At the Steinbeck and David locations, the principal response was to sulfur. The Light location responded markedly to both phosphate and sulfur.

The 1961 data indicated a rather strong phosphate x sulfur interaction. The 1962 treatments were not chosen to measure this interaction but the treatments included do not tend to indicate the presence of an interaction possibly because the soil phosphate level appears to be high at three of the locations.

Table No. 1

The Effect of Phosphate, Potash and Sulfur Fertilizer Application  
and the Effect of Time and Rate of Nitrogen Fertilizer Application  
on Kentucky Bluegrass Seed Yield in Pounds Per Acre

J. D. Steinbeck Farm - Culver, Oregon - 1962

Fertilizer Application in Pds/Acre			Time and Rate of <sup>(1)</sup> Nitrogen Appl.			Average <sup>(2)</sup> Seed Yield Pds/Acre	Significance	Average <sup>(3)</sup> Light Seed Pds/Acre
P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	S	Fall	Winter	Spring			
80	80	80	0150	-	-	803.4		109.0
0	80	80	0150	-	-	712.1		132.2
80	0	80	0150	-	-	695.8		100.7
80	80	80	-	D150	-	620.7		89.0
80	80	0	0150	-	-	585.1		100.3
80	80	80	-	J150	0	456.0		78.8
80	80	80	0100	-	-	435.8		75.1
80	80	80	N150	-	-	404.3		76.9
80	80	80	-	F150	-	383.7		73.6
80	80	80	0 50	-	M100	333.4		66.3
80	80	80	0 50	-	-	246.0		86.3
80	80	80	-	-	-	78.0		32.7
-	-	-	-	-	-	39.2		39.8

Coefficient of Variation 35.1%

(1) Time of Application:

- O - October 16, 1961
- N - November 14, 1961
- D - December 21, 1961
- J - January 15, 1962
- F - February 15, 1962
- M - March 16, 1962

(2) Bushel weight: all plots 21.50 pounds per bushel

(3) Bushel weight: all plots approximately 12.00 pounds per bushel.

Harvested July 13, 1962

Table No. 2

The Effect of Phosphate, Potash and Sulfur Fertilizer Application  
and the Effect of Time and Rate of Nitrogen Fertilizer Application  
on C-1 Kentucky Bluegrass Seed Yield in Pounds Per Acre

Leslie Ramsey Farm - Madras, Oregon -- 1962

Fertilizer Application in Pds/Acre			Time and Rate of (1) Nitrogen Appl.			Average (2) Seed Yield Pds/Acre	Significance	Average (3) Light Seed Pds/Acre
P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	S	Fall	Winter	Spring	Light Seed Pds/Acre		
80	80	0	0150	-	-	985.0		73.2
0	80	80	0150	-	-	912.4		78.8
80	80	80	0150	-	-	890.9		76.1
80	80	80	-	J150	-	849.0		92.8
80	80	80	-	D150	-	784.8		69.0
80	0	80	0150	-	-	774.8		60.5
80	80	80	0100	-	-	769.8		62.6
80	80	80	0 50	-	M100	744.6		74.0
80	80	80	-	F150	-	733.5		74.0
80	80	80	N150	-	-	699.7		61.9
80	80	80	0 50	-	-	302.8		42.1
0	0	0	-	-	-	33.0		13.8
80	80	80	-	-	-	32.8		10.8

Coefficient of Variation - 16.4%

(1) Time of Application:

O - October 13, 1961  
N - November 14, 1961  
D - December 21, 1961  
J - January 15, 1962  
F - February 15, 1962  
M - March 16, 1962

(2) Bushel Weight: all plots 20 pounds per bushel.

(3) Bushel Weight: all plots approximately 10 pounds per bushel.

Harvested July 14, 1962

Table No. 3

The Effect of Phosphate, Potash and Sulfur Fertilizer Application  
and the Effect of Time and Rate of Nitrogen Fertilizer Application  
on Merion Bluegrass Seed Yield in Pounds Per Acre

Marvin Light Farm - Madras, Oregon - 1962

Fertilizer Application in Pds/Acre Time and Rate of (1) Nitrogen Appl.						Average (2) Seed Yield Pds/Acre	Significance	Average (3) Light Seed Pds/Acre
P2O5	K2O	S	Fall	Winter	Spring			
80	80	80	0150	-	-	350.7		148.0
80	0	80	0150	-	-	345.7		117.2
80	80	80	-	D150	-	340.3		135.5
80	80	80	-	F150	-	315.3		122.6
80	80	80	N150	-	-	307.8		119.1
80	80	80	-	J150	-	307.5		126.8
80	80	0	0150	-	-	302.7		121.8
0	80	80	0150	-	-	289.2		119.7
80	80	80	0 50	-	M100	267.9		96.7
80	80	80	0100	-	-	235.2		87.6
80	80	80	0 50	-	-	125.9		63.8
0	0	0	-	-	-	51.5		35.9
80	80	80	-	-	-	29.4		18.6

Coefficient of Variation - 21.5%

(1) Time of Application:

- O - October 11, 1961
- N - November 14, 1961
- D - December 21, 1961
- J - January 15, 1962
- F - February 15, 1962
- M - March 16, 1962

(2) Bushel weight: all plots 20 pounds per bushel

(3) Bushel weight: all plots approximately 10 pounds per bushel.

Harvested July 14, 1962

Table No. 4

The Effect of Phosphate, Potash and Sulfur Fertilizer Application and the Effect of Time and Rate of Nitrogen Fertilizer Application, on Merion Bluegrass Seed Yield in Pounds Per Acre

Henry David Farm - Culver, Oregon. - 1962

Fertilizer Application in Pds/Acre			Time and Rate of (1) Nitrogen Appl.			Average (2) Seed Yield Pds/Acre	Significance	Average (3) Light Seed Pds/Acre
P2O5	K2O	S	Fall	Winter	Spring			
0	80	80	0150	-	-	104.3		64.6
80	0	80	0150	-	-	79.7		60.1
80	80	80	0150	-	-	75.3		46.7
80	80	80	N150	-	-	74.9		44.2
80	80	80	-	J150	-	73.0		58.2
80	80	80	-	D150	-	70.5		50.9
80	80	80	-	F150	-	69.2		65.5
80	80	-	0150	-	-	66.9		49.6
80	80	80	0 50	-	M100	64.0		64.0
80	80	80	0100	-	-	63.6		46.9
80	80	80	0 50	-	-	35.5		32.7
-	-	-	-	-	-	10.8		11.3
80	80	80	-	-	-	7.3		8.1

Coefficient of Variation - 44.4%

(1) Time of Application:

- O - October 13, 1961
- N - November 14, 1961
- D - December 21, 1961
- J - January 15, 1962
- F - February 15, 1962
- M - March 16, 1962

(2) Bushel weight: all plots 20 pounds per bushel

(3) Bushel weight: all plots approximately 10 pounds per bushel.

Harvested July 23, 1962

The C-1 and Kentucky Bluegrass locations appeared to respond a little stronger to potash than did the Merion locations. Whether this is due to variety or location, it is impossible to tell at this time.

The large amount of variation at two of the locations, C.V.'s of 35.1 and 44.4%, necessarily makes the interpretation of the data somewhat hazardous even though there is some significant data in all locations.

Two well known facts are again demonstrated by significant data in the trials. The first, that nitrogen pays and the second, that phosphate, potash and sulfur applications on high nitrogen crops without an application of nitrogen does not pay.

At three of the four locations, the highest single treatment, in each case containing a single October application of 150 lbs. of nitrogen, was significantly higher yielding than a split application of 50 lbs. of nitrogen in October and 100 lbs. in March.

The highest yielding October applied 150 lb. rate of nitrogen was significantly higher yielding than the 100 lb. rate of nitrogen in three out of four locations. The average pounds of seed produced for each pound of nitrogen are shown below for each level of nitrogen applied.

<u>Nitrogen Rate</u>	<u>Aver. Seed Yield for four locations</u>	<u>Pounds of Seed for Lbs. of N</u>
150	530.1	3.1
100	376.1	4.0
50	177.6	2.8
0	36.9	---

The above values were calculated by subtracting the seed produced at the lower nitrogen level from the seed produced at a given nitrogen level and dividing the remainder by 50. The results are somewhat biased by the much larger gains in the Kentucky bluegrass varieties which exceed 5 pounds of seed per pound of nitrogen.

The effect of the time of nitrogen application appears to vary somewhat between the Merion and the Kentucky types of Kentucky Bluegrass. This variance may be associated with the time of primordial development of the seed head. The change from vegetative to floral primordial did not start until March 14, at the Marvin Light farm and at the later date on the Henry David farm. The Kentucky varieties were not checked.